

CLAIMS

What is claimed is:

- 5 1. A method for identifying a bacteriophage coding region encoding a product active on an essential bacterial target, comprising identifying a nucleic acid sequence encoding a gene product which provides a bacteria-inhibiting function when said bacteriophage infects a host bacterium,
wherein said bacteriophage is uncharacterized and said host bacterium is a
10 pathogenic bacterium.
- 15 2. The method of claim 1, further comprising expressing a recombinant bacteriophage ORF in cells of a bacterial strain, wherein inhibition of said cells following expression of said ORF is indicative that said product is active on an essential bacterial target.
- 20 3. The method of claim 2, wherein inhibition of said bacterium following expression of said ORF is determined by comparison with the growth or viability of said bacterium following expression of an inactivated mutant form of said ORF or in the absence of expression of said ORF, and wherein inhibition of said bacterium following expression of said ORF is indicative that said product is active on an essential bacterial target.
- 25 4. The method of claim 2, wherein expression of said ORF is inducible.
5. The method of claim 1, further comprising confirming the inhibitor function of said ORF.
- 30 6. The method of claim 5, wherein said confirming comprises expressing a loss-of-function mutant form of said ORF in said host bacterium.
- 35 7. A method for identifying a potential target for antibacterial agents, comprising determining the bacterial target of an uncharacterized bacteriophage inhibitor protein.
8. The method of claim 7, wherein said determining comprises identifying at least one bacterial protein which binds to said bacteriophage inhibitor protein or a fragment thereof.

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9. A method for identifying a potential target for antibacterial agents, comprising determining the bacterial target of an uncharacterized bacteriophage inhibitor protein.
- 5 10. The method of claim 9, wherein said determining comprises identifying at least one bacterial protein which binds to said bacteriophage inhibitor protein or a fragment thereof.
11. The method of claim 9, wherein said determining comprises identifying at
10 least one protein:protein interaction using a genetic screen.
12. The method of claim 9, wherein said determining further comprises identifying a bacterial nucleic acid sequence encoding a polypeptide target of said bacteriophage inhibitor protein.
- 15 13. The method of claim 12, wherein said nucleic acid sequence is identified by determining at least a portion of the amino acid sequence of a bacterial protein target, and identifying a bacterial nucleic acid sequence which encodes said protein target.
- 20 14. The method of claim 9, further comprising identifying a bacteriophage ORF which encodes a product having a bacteria-inhibiting function.
- 25 15. The method of claim 14, wherein said identifying a phage ORF comprises expressing at least one bacteriophage ORF in a bacterium, wherein inhibition of said bacterium following said expression is indicative that said ORF encodes a bacteria-inhibiting function.
- 30 16. An isolated, purified, or enriched nucleic acid sequence at least 15 nucleotides in length, wherein said sequence corresponds to at least a portion of a bacteriophage sequence, and wherein said bacteriophage is selected from the group consisting of *Staphylococcus aureus* bacteriophage 77, 3A, and 96.
- 35 17. The nucleic acid sequence of claim 16, wherein said nucleic acid sequence corresponds to at least a portion of a nucleic acid sequence which encodes a product which provides a bacteria-inhibiting function.

18. The nucleic acid sequence of claim 16, wherein said nucleic acid sequence is transcriptionally linked with regulatory sequences enabling induction of expression of said sequence.

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19. An isolated, purified, or enriched polypeptide comprising at least a portion of a protein providing a bacteria-inhibiting function, wherein said polypeptide is normally encoded by a bacteriophage selected from the group consisting of *Staphylococcus aureus* bacteriophage 77, 3A, and 96.

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20. The polypeptide of claim 19, wherein said polypeptide provides said bacteria-inhibiting function.

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21. A recombinant vector comprising a bacteriophage ORF corresponding to an ORF from a bacteriophage having a pathogenic bacterial host, wherein said bacterial host is selected from the group consisting of uncharacterized bacteria of Table 1.

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22. A recombinant cell comprising a vector, wherein said vector comprises an ORF from a bacteriophage having a pathogenic bacterial host, wherein said bacterial host is selected from the group consisting of bacterial species of Table 1.

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23. A method for identifying an antibacterial agent, comprising identifying an active portion of a product of a bacteria-inhibiting ORF of a bacteriophage.

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24. The method of claim 23, further comprising constructing a synthetic peptidomimetic molecule, wherein the structure of said molecule corresponds to the structure of said active portion.

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25. A method for identifying a compound active on a target of a bacteriophage inhibitor protein, comprising the step of
contacting a bacterial target protein with a test compound; and
determining whether said compound binds to or reduces the level of activity of said target protein,

wherein binding of said compound with said target protein or a reduction of the level of activity of said protein is indicative that said compound is active on said target and wherein said target is uncharacterized.

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26. A method of screening for potential antibacterial agents, comprising the step of determining whether any of a plurality of compounds is active on a target of a bacteriophage inhibitor protein,

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wherein said target is naturally produced by a pathogenic bacterium.

27. A method for inhibiting a bacterium, comprising the step of;

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contacting said bacterium with a compound active on a target of a bacteriophage inhibitor protein, wherein said target or the target site is uncharacterized.

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28. A method for treating a bacterial infection in an animal suffering from an infection, comprising administering to said animal a therapeutically effective amount of compound active on a target of a bacteriophage inhibitor protein in a bacterium involved in said infection,

wherein said target is an uncharacterized target or the compound is active at an uncharacterized target site.

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29. A method for prophylactically treating an animal at risk of an infection, comprising administering to said animal a prophylactically effective amount of a compound active on a target of a bacteriophage inhibitor protein,

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wherein said target is an uncharacterized target or the site of action of said compound is an uncharacterized target site.

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30. An antibacterial agent active on a target of a bacteriophage inhibitor protein, wherein said target is an uncharacterized target or said agent is active at a phage-specific site on said target.

31. A method of making an antibacterial agent, comprising the steps of:

a) identifying a target of a bacteriophage inhibitor polypeptide;
b) screening a plurality of test compounds to identify a compound active on said target; and

5 c) synthesizing said compound in an amount sufficient to provide a therapeutic effect when administered to an organism infected by a bacterium naturally producing said target.

10 32. A computer readable device having recorded therein a nucleotide sequence of a portion of at least one bacteriophage genome of *Staphylococcus aureus* bacteriophage 77, bacteriophage 3A, or bacteriophage 96, a nucleotide sequence at least 95% identical to a said nucleotide sequence, a ribonucleic acid equivalent, a degenerate equivalent, a homologous sequence, or at least one amino acid sequence
15 encoded by said nucleotide sequence; and

a nucleotide sequence or amino acid sequence analysis program,
wherein said program can perform at least one sequence analysis on said nucleotide or amino acid sequence.

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33. A computer-based system for identifying biologically important portions of a bacteriophage genome, comprising:

a) a data storage medium having recorded thereon a nucleotide sequence corresponding to a portion of at least one bacteriophage genome, wherein said bacteriophage genome is uncharacterized;
25 b) a set of instructions allowing searching of said sequence to analyze said sequence; and
c) an output device.

30 34. The system of claim 33, wherein said bacteriophage genome is of a bacteriophage selected from the group consisting of uncharacterized bacteriophage listed in Table 1.

35 35. A method for identifying or characterizing a bacteriophage ORF, comprising the steps of:

a) providing a computer-based system for analyzing nucleic acid or amino acid sequence data, wherein said system comprises a data storage

medium having recorded thereon at least one nucleotide or amino acid sequence corresponding to a portion of at least one uncharacterized bacteriophage genome, a set of instructions allowing searching of said sequence to analyze said sequence; and an output device;

- 5 b) analyzing at least a portion of at least one said sequence; and
c) outputting results of said analyzing to said output device.

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